Medical Technicians

The Present Need and Training in California

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THE SHORTAGE of medical laboratory technicians is still critical, although the present survey of clinical laboratories in California shows that the scarcity has slightly lessened within the past few years.

Five years ago a survey was made to determine the need for laboratory technicians throughout the state.[1] It showed a 14.5 per cent deficit of technicians at that time. Because of the continued shortage of properly trained technicians, and the interest displayed by the medical profession in the last survey, it was felt that a second survey should be made. It was also thought that it would be of value to consider the future outlook by surveying the apprenticeships available for student technicians. Accordingly, another survey was conducted in an effort to reveal the reason for, and the extent of, the shortage of technicians.

On April 30, 1953, questionnaires were sent to 700 laboratory directors in California. Of the 432 answers received, 176 were from directors of hospital laboratories, 198 from directors of private clinical laboratories, and 58 from doctors having laboratories in their offices. Following are the questions and a summary of the answers:

1. Q: What is the number of licensed technicians or technologists in your laboratory?
   A: 1,486 technicians were employed in the 432 laboratories.
2. Q: What is the number of current vacancies in your laboratory?
   A: 210 vacancies in the 432 laboratories (a shortage of 12.4 per cent).
3. Q: What is your average yearly turnover of technicians?
   A: Approximately one-third of the total number of technicians employed.
4. Q: Are licensed technicians easily obtained?

	No	*Yes*	*No Answer*
A:	343 (79%)	63 (15%)	26 (6%)

5. Q: What is the quality of available technicians?

A: *Number of Laboratories*	*Answer*
46	Excellent
164	Good
149	Fair
24	Poor
5	No technicians available
7	Variable
37	No answer

6. a) Q: What is the number of apprentices or trainees in your laboratory?
   A: 313 trainees in the 432 laboratories.

   b) Q: What was the previous education of trainees?

A: *Number of Trainees*	*Years of College*
49	0
14	1
67	2
27	3
156	4 or more

Major in College:		*College Degree:*	
Science	Non-Science	Yes	No
172 (55%)	141 (45%)	154 (49%)	159 (51%)

   c) Q: Do trainees receive maintenance in any form?

A: *Salary*	*Meals and Room*	*No Maintenance*
258 (82%)	10 (3%)	45 (15%)

The survey revealed a 12.4 per cent shortage of technicians in the 432 laboratories. It also showed a ratio of one student to five technicians, and a yearly turnover of approximately one-third of all technicians employed. Thus, there are not enough students to replace the yearly loss of technicians. Since the majority of technicians are women of marriageable age, the turnover is understandable; the small number of students is not. Medical technology has become a more recognized field, as evidenced by the increasing number of colleges which offer this subject as a major course of study. The program generally includes three years of college work, with emphasis on chemistry and biology, and a fourth year of hospital apprenticeship. This training leads to a degree of bachelor of science in medical technology. The University of California School of Medicine, recognizing the need for such a program, has changed the requirements for admission to the Curriculum in Medical Technology in order to include students enrolled in these four-year courses (see Appendix I). Of the 313 apprentices in the laboratories covered by the survey, 7 per cent were completing requirements for a degree on this type of program.

One of the main reasons for the shortage of technicians is the scarcity of available apprenticeships (only 37 per cent of the laboratories offered apprenticeships). Students who have obtained degrees in subjects other than medical technology must spend a year of apprenticeship training in order to qualify for state licensure (see Appendix II) and national registration (see Appendix III). Not only are they

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hindered by a scarcity of available apprenticeships, but economic conditions at the present time may prevent most of them from spending a fifth year in training without maintenance in any form.

According to our survey, however, the status of student technicians has improved within the past few years. Of the 313 students who obtained apprenticeships, 82 per cent received a salary, 3 per cent received meals and room; approximately 15 per cent received no compensation. Although no question was asked concerning the amount of the salaries paid to the students, some of the laboratory directors supplied this information. The salaries paid to students ranged from $50 to $256 a month, with an average of approximately $175 a month.

An additional reason for the shortage of technicians is the high qualifications which laboratory directors demand of technicians today. Once satisfied with technicians who had a minimum of scientific education and experience, they now seek personnel with college background who have had training in all phases of laboratory work. This change is shown not only in the survey, where the average laboratory director rated the quality of the majority of technicians as only fair to good, but also in the comments of the directors concerning the type of technicians available today. One of the most common criticisms offered by the directors concerned the large number of poorly qualified, unlicensed technicians working in doctors' offices. The observations of the laboratory directors are verified to some extent by the survey which reveals that of the 313 students, 55 per cent were science majors, 12 per cent had some college science, and 33 per cent had taken no science courses whatever; furthermore, only 49 per cent had a college degree. The situation seems to present a paradox: While maintenance of high educational standards is desirable in principle, in practice it apparently has aggravated the shortage of technicians. Moreover, with highly educated and trained personnel go higher salaries and, to cover this, increased fees which lessen the availability of laboratory tests for the average patient. (It should be noted here that statistics* show the price index for medical care in San Francisco had risen from 100.5 in 1948 to 118.4 in 1952, and by September of 1953 to 122.6.)

At the time of the last survey, insufficient remuneration was believed to be one of the reasons for the shortage of technicians. Although this may still be a cause, it does not seem to be so important a factor now as it was. A survey conducted jointly by the Bay Area Salary Committee and the United States Bureau of Labor Statistics showed that the interquartile range† of salaries of clinical laboratory technicians in 1953 was $300 to $335 (weighted average $317), whereas in 1948 the results of a similar survey showed the interquartile range to be $200 to $244 (weighted average $234). During the same period, statistics* show, in San Francisco the consumer price index for all items rose from 102.3 in 1948 to 116.9 in 1953. Thus, salaries for technicians have risen more than the cost of living in San Francisco. It is notable, however, that Montgomery[2] reported in a recent article that in private industries newly graduated scientists are offered starting salaries of about $375 a month. Since employers in fields other than medicine apparently are in a position to offer higher wages than employers in the medical field, science graduates are likely to be lured into non-medical technical positions. In addition, recruitment of these students is carried out on a large competitive scale by commercial companies.

What, then, are the main reasons for the shortage of technicians and what can be done to solve the problem? The following reasons are indicated by the results of both of our surveys:

1. *The small number of students in the field.*

This lack could be partly remedied by promoting interest in the field of medical technology by means of pamphlets distributed to schools, radio spot announcements, and use of advertising cards in the city trolley cars and buses. Some of these suggestions are being carried out by the Committee on Public Relations of the California Association of Medical Laboratory Technicians. This is in addition to the technician recruitment program on a national scale launched this year by the American Society of Clinical Pathologists, the College of American Pathologists and the American Society of Medical Technologists with grants and support from the American Cancer Society and the U. S. Public Health Service (National Cancer Institute). Still it would seem to be a responsibility of county medical societies and similar groups to stimulate recruitment of students into this necessary ancillary branch of medicine.

2. *The expense of four years of college work plus one year of unpaid apprenticeship.*

This problem could be solved by (a) establishing more four-year programs with an apprenticeship included in the fourth year, and (b) by supplying paid apprenticeships to students who have already completed their college work.

3. *The scarcity of available apprenticeships.*

This obviously requires the cooperation of laboratory directors and hospital administrators in offering facilities and planned programs of apprenticeship training to student technicians.

*United States Department of Labor, Bureau of Labor Statistics.

†The range of rates received by the middle 50 per cent of the employees. The weighted average (mean) is obtained by dividing the sum of all rates of all employees by the total number of employees.

APPENDICES

I. *Requirements for Admission to the Curriculum in Medical Technology, University of California School of Medicine:*

Applicants must have either of the following:

1. Bachelor's Degree.

Applicants for admission on this basis must hold a bachelor's degree with a major in one of the biological sciences. Courses taken in preparation for the major must have included Bacteriology 101, Biochemistry 102 or 100A-100B, and Biochemistry 101A-101B, or their equivalent.

2. Three years of college training.

Applicants for admission on this basis must have completed three years of a regulation curriculum in medical or clinical laboratory technique. This curriculum must have included courses in biochemistry and advanced bacteriology. Applicants will not be considered unless the college they attended shall grant a bachelor's degree to them upon satisfactory completion of the four-year curriculum.

II. *Prerequisites for Entrance into the Examination for California State Licensure:*

1. Completion of a regular four-year college or university curriculum in medical or clinical laboratory technique, with a degree of bachelor of arts or bachelor of science in a college or university approved by the department (State Department of Public Health), the last year of which course shall have been primarily clinical laboratory procedure; provided, however, that if the curriculum did not include practical clinical laboratory work, six months as a clinical laboratory technician trainee or the equivalent, as determined by the department, in a clinical laboratory approved by the department shall be required; or

2. Graduation from a college or university maintaining standards equivalent, as determined by the department, to those institutions accredited by the American Association of Universities with a degree of bachelor of arts or bachelor of science and a major in bacteriology, biochemistry, or essentially equivalent subject or subjects, as may be determined by the department, plus one year as a clinical laboratory technician trainee or the equivalent as determined by the department in a clinical laboratory approved by the department. One year of practical experience in a public health laboratory may be accepted if such experience or if university or college courses included practical work in clinical biochemistry and hematology; or

3. Graduation from high school or the equivalent as determined by the department, with a minimum of five years' experience as a clinical laboratory technician trainee or the equivalent as determined by the department, doing clinical laboratory work embracing the various fields of clinical laboratory activity in a clinical laboratory approved by the department, except that university or college work which includes courses in the fundamental sciences may be substituted for such experience to a maximum of four years in the ratio of 30 semester hours or equivalent quarter hours for each year of experience, and further, except, that time spent in a school approved by the department shall count as acceptable experience on a month-for-month basis.

III. *Requirements for Admittance to the Examination of the Registry of Medical Technologists of the American Society of Clinical Pathologists:*

Two years (60 semester hours) of college work in any college or university accredited by a recognized standardizing association. During the two years the following courses must be taken: Biology: 12 semester hours, which may include general biology, zoology, bacteriology, parasitology, anatomy, histology, or embryology. Chemistry: One year of inorganic chemistry (6 semester hours) including lectures and laboratory; and 3 semester hours of quantitative analysis, organic chemistry or biochemistry, including lectures and laboratory.

Electives: Sufficient to give a total of 60 semester hours of college credit; *plus,* instruction in medical technology for at least 12 consecutive months in a school of medical technology approved by the Council on Medical Education and Hospitals of the American Medical Association.

IV. *Curriculum in Medical Technology—University of California School of Medicine:*

The University of California School of Medicine offers a training program to students preparing to be medical laboratory technicians. The curriculum is given as a practical apprenticeship. It consists of one year of full-time work, and covers training in biochemistry, medical bacteriology, clinical pathology, parasitology, mycology, blood bank procedures, serology, histologic technique, basal metabolism, and electrocardiography. The laboratory work is done by the students under the supervision and instruction of the graduate technicians and certain faculty members of the School of Medicine. The students are assigned to a rotating service in the various clinical and teaching laboratories of the University of California Hospital, the School of Medicine, and associated institutions.

Graduates are eligible to take the California state examination and the National Registry examination.

REFERENCES

1. Hopper, J., Jr., and Greefkens, R.: Medical technicians: The present need and training in California, Calif. Med., 73:2, Aug. 1950.

2. Montgomery, L. G.: Medical technology and its relation to physiology and pathology, J.A.M.A., 154:39-42, Jan. 2, 1954.